Biology, Symptoms and Management of Scleroderris canker

Scleroderris canker (caused by the fungus *Gremmeniella abietina*) is a disease which causes shoot and tree death of jack and red pine in the Lake States.

Biology & Symptoms

In Michigan and northern Wisconsin, *Gremmeniella* is most often observed in red and jack pine plantings. The fungus produces a sexual fruiting structure called an apothecium on tissue that has been dead one to two years. The spores from this structure are wind dispersed during moist weather from April to October, though most spore dispersal occurs in June and July. The spores infect buds and the base of needle fascicles. The fungus does not grow on into the shoot and kill tissue until the shoot is dormant during the winter, so damage is not evident until the following spring. Stressed trees (such as those in frost pockets) are prone to more damage, as host defenses against the disease are reduced. The fungus grows well in the cool, moist conditions that are present under snow cover, so damage is greatest below snow level. Symptoms of infection are first visible in the spring, when the needles on infected shoots begin to turn red from the bases outward. The killed needles are loose in the fascicle, and are easily pulled or fall out.

On shoots where the needles are loose or have fallen out, a green stain can often be observed beneath the bark. Black asexual fruiting structures called pycnidia are formed in the needle fascicle holes of recently killed shoots. These fruiting bodies produce spores which ooze out of the shoot during wet weather from April to October and are rain splashed to nearby branches. The infections resulting from these spores cause a localized build-up of damage.

The fungus can continue to grow in the branch tissue and reach the main stem, where it can cause a canker. This more commonly occurs on very small or stressed trees.

There are two recognized strains of the disease. The North American or "low" race usually causes damage primarily below six feet above ground. This is the only race we believe is present in Michigan and Wisconsin. The European or "high" race can cause damage throughout the crown of the tree, and thus has the potential to be much more damaging. This race has been identified in parts of Quebec, New Brunswick, Newfoundland, Ontario and New York.

Management

The impact of *Gremmeniella* is greatest when it becomes established on the trees while they are still very small. Impact on larger trees is minimal. Therefore it is very important to keep trees disease free during plantation establishment.

Plant only disease-free material. Infected nursery stock is thought to be the source of many of the Scleroderris canker (*Gremmeniella*) outbreak problems which occurred in the 1960's. Effective fungicide programs were developed for the nurseries in the 1970's, and, as long as the nurseries are maintaining and effective fungicide program, the outplanted material should be free of this problem.

- Do not replant red or jack pine onto sites which have failed due to *Gremmeniella* or are adjacent to stands with a high incidence.
- Avoid planting in frost pockets, which are particularly prone to damage from *Gremmeniella*.
- Use buffer strips without trees or with trees of resistant species (hardwoods, balsam fir, tamarack, white spruce or white pine) between newly planted trees and infected trees. Buffer strips should be approximately 100 yards wide.

Death of lower branches of red pine, caused by *Gremmeniella* infection. June 1997.

Apothecia of *Gremmeniella* on the cankered bark of a small, red pine stem.

Green discoloration and pycnidia of *Gremmeniella* in red pine shoot.

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